WASSCE 2026
ELECTIVE INFORMATION AND COMMUNICATIONS TECHNOLOGY 2
FULL SOLUTIONS

Instruction note: The paper says to answer one question from Section A and four questions from Section B. Since you asked me to solve all, this PDF solves every question for revision.

SECTION A - COMPULSORY QUESTION

Question 1(a)(i). A secondary school intends to automate its library operations. Explain the term Information System. [2 marks]

An **Information System** is an organized combination of people, hardware, software, data, procedures and communication networks used to collect, process, store and distribute information for decision-making. In a school library, it can manage books, borrowers, borrowing dates, returns and overdue fines.

Question 1(a)(ii). State three advantages of using a database instead of a spreadsheet to manage book records. [3 marks]

• A database reduces data duplication because related records can be stored in linked tables.

• It provides better searching, sorting and querying of book, borrower and loan records.

• It supports better security and access control, so only authorized users can change records.

• It can handle a larger amount of data more reliably than a spreadsheet.

Question 1(a)(iii). Convert the total number of books, 250 base 10, to binary and hexadecimal. [4 marks]

Binary conversion by repeated division by 2:

Division	Quotient	Remainder
250 ÷ 2	125	0
125 ÷ 2	62	1
62 ÷ 2	31	0
31 ÷ 2	15	1
15 ÷ 2	7	1
7 ÷ 2	3	1
3 ÷ 2	1	1
1 ÷ 2	0	1

Reading the remainders from bottom to top gives **11111010■**. Therefore, **250■■ = 11111010■**.

Hexadecimal conversion: 250 ÷ 16 = 15 remainder 10. In hexadecimal, 15 = F and 10 = A. Therefore, **250■■ = FA■■**.

Final answer: 250■■ = 11111010■ = FA■■.

Question 1(b). Write a pseudocode to input the number of days a book is overdue and calculate the fine based on: GH■0.50 per day for 1-7 days, GH■1.00 per day for 8-14 days, and GH■2.00 per day above 14 days. [6 marks]

```
START
    INPUT daysOverdue

    IF daysOverdue <= 0 THEN
        fine = 0
    ELSE IF daysOverdue <= 7 THEN
        fine = daysOverdue * 0.50
```

```
    ELSE IF daysOverdue <= 14 THEN
        fine = daysOverdue * 1.00
    ELSE
        fine = daysOverdue * 2.00
    ENDIF

    OUTPUT "Fine to be paid is GHc", fine
END
```

Question 1(c)(i). List two ICT tools that can be used to teach students how to search the library catalogue. [2 marks]

• Computer or laptop connected to the library catalogue system.

• Projector or interactive whiteboard for demonstration.

• Other acceptable examples include tablets, internet browser, library management software and online catalogue system.

Question 1(c)(ii). State three negative effects of excessive internet use on students. [3 marks]

• It can reduce study time and lead to poor academic performance.

• It can expose students to cyberbullying, fraud or harmful content.

• It can cause health problems such as eye strain, poor sleep and addiction.

• It may reduce face-to-face communication and social skills.

SECTION B - ALL QUESTIONS SOLVED

Question 2(a). Describe the following terms: (i) Bandwidth; (ii) IP address; (iii) Firewall. [6 marks]

(i) Bandwidth: Bandwidth is the amount of data that can be transmitted over a network connection in a given time. It is usually measured in bits per second, such as Mbps or Gbps.

(ii) IP address: An IP address is a unique numerical address assigned to a device on a network so that the device can be identified and communicate with other devices.

(iii) Firewall: A firewall is a hardware or software security system that monitors and controls incoming and outgoing network traffic to protect a network from unauthorized access.

Question 2(b)(i). The ICT lab in a school has 25 computers to be networked. Name the most suitable network topology for the lab. [1 mark]

The most suitable topology is **star topology**.

Question 2(b)(ii). Give two reasons for your answer in 2(b)(i). [4 marks]

• It is easy to add or remove computers because each computer connects separately to a central switch.

• If one computer cable fails, only that computer is affected; the rest of the network can continue working.

• It is easier to troubleshoot because faults can be traced to a particular computer or cable.

Question 2(b)(iii). State two negative factors that affect the performance of the network. [4 marks]

• Low bandwidth or slow internet connection can reduce network speed.

• Too many users accessing the network at the same time can cause congestion.

• Faulty cables, weak wireless signals or damaged switches can affect performance.

• Viruses, malware and unauthorized access can slow down the network.

Question 3(a). Explain the following features as used in word processing: (i) Mail merge; (ii) Table of contents; (iii) Watermark. [6 marks]

(i) Mail merge: Mail merge is a word processing feature used to create many personalized documents, such as letters or certificates, by combining a main document with a data source containing names, addresses or other details.

(ii) Table of contents: A table of contents is a list of the main headings and subheadings in a document with their page numbers. It helps readers locate sections quickly.

(iii) Watermark: A watermark is faint text or an image placed behind the main text of a document. It may show words such as DRAFT, CONFIDENTIAL or the school logo.

Question 3(b)(i). A teacher wants to design a school magazine. Name two software applications suitable for the task. [2 marks]

• Microsoft Publisher

• Adobe InDesign

• Other acceptable examples include Microsoft Word, Canva, Scribus and CorelDRAW.

Question 3(b)(ii). State four steps to insert a page number that starts from page 2 as '1'. [4 marks]

• Place the cursor at the end of page 1 and insert a section break to start a new section on page 2.

• Open the header or footer area on page 2 and turn off Link to Previous.

• Insert the page number in the header or footer on page 2.

• Choose Format Page Numbers and set Start at: 1.

Question 3(b)(iii). Give three differences between the applications you named in 3(b)(i). [3 marks]

Using Microsoft Publisher and Adobe InDesign as examples:

• Microsoft Publisher is easier for beginners, while Adobe InDesign is more advanced and professional.

• Publisher is commonly used for simple school flyers, newsletters and magazines, while InDesign is used for professional magazines, books and newspapers.

• Publisher is usually cheaper and simpler, while InDesign has more advanced layout, typography and publishing tools.

Question 4(a). Study the spreadsheet snippet below and answer the questions that follow.

	A	B	C	D
1	Name	Test 1	Test 2	Total
2	Ama	15	18	
3	Kojo	12	14	

Question 4(a)(i). Write the formula to calculate the total for Ama in cell D2. [2 marks]

=B2+C2

Alternatively: **=SUM(B2:C2)**

Question 4(a)(ii). Write a formula using IF function to return "Pass" if Total is 20 or more, otherwise "Fail". [3 marks]

If the total is in cell D2, the formula is: **=IF(D2>=20,"Pass","Fail")**

Question 4(a)(iii). Explain how to create a column chart for the data. [3 marks]

• Highlight the data range to be used for the chart, for example A1:D3.

• Click Insert on the ribbon and choose Column Chart.

• Select the preferred column chart type and add a chart title, axis titles or data labels if needed.

Question 4(b)(i). Define primary key. [2 marks]

A **primary key** is a field, or combination of fields, that uniquely identifies each record in a database table. It cannot contain duplicate or null values.

Question 4(b)(ii). Explain two reasons why a primary key is important in a student database. [4 marks]

• It uniquely identifies each student, so two students with similar names will not be confused.

• It prevents duplicate records because the same primary key value cannot be repeated.

• It helps link the student table to other tables, such as fees, results or attendance tables.

Question 4(b)(iii). Give one example of data validation that can be applied to a “Date of Birth” field. [1 mark]

The field should accept only valid dates and should not allow future dates. Example validation rule: Date of Birth must be less than today’s date.

Question 5(a)(i). Distinguish between system software and application software. [4 marks]

System software manages and controls computer hardware and provides a platform for other software to run.
Application software helps users perform specific tasks such as typing, calculating, browsing or designing.

Question 5(a)(ii). Give two examples of each. [4 marks]

System software examples: Operating system such as Windows or Linux; utility program such as antivirus or disk cleanup.
Application software examples: Microsoft Word; Microsoft Excel; web browser; CorelDRAW.

Question 5(b)(i). What is data encryption? [2 marks]

Data encryption is the process of converting readable data into a coded form so that only authorized users with the correct key or password can read it.

Question 5(b)(ii). State two ways a school can protect digital student records from unauthorized access. [4 marks]

• Use strong passwords and give access only to authorized staff.

• Encrypt sensitive student records.

• Install antivirus software and keep systems updated.

• Use regular backups and secure user permissions.

Question 5(b)(iii). List one ICT policy a school can adopt to promote responsible use of technology. [1 mark]

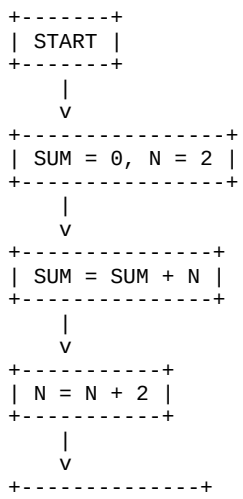
An example is an **Acceptable Use Policy (AUP)**.

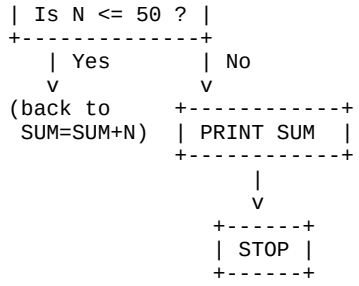
Question 6(a)(i). Define the term algorithm. [2 marks]

An algorithm is a finite step-by-step set of instructions used to solve a problem or perform a task.

Question 6(a)(ii). Draw a flowchart to find the sum of all even numbers between 1 and 50. [5 marks]

The flowchart logic is: Start, set SUM = 0 and N = 2, add N to SUM, increase N by 2, test whether N is less than or equal to 50, repeat if yes, output SUM if no, then stop.





Question 6(b)(i). Explain the following data types: Boolean, String. [4 marks]

Boolean: A data type that can hold only two values, usually TRUE or FALSE. Example: isPaid = TRUE.

String: A data type used to store text, letters, numbers or symbols treated as characters. Example: "Ama Mensah".

Question 6(b)(ii). Convert 3A base 16 to denary and binary. [4 marks]

Denary conversion: 3A■■ = (3 × 16) + 10 = 48 + 10 = **58■■**.

Binary conversion: 3 = 0011 and A = 1010. Therefore, **3A■■ = 00111010■**.

Final answer: 3A■■ = 58■■ = 00111010■.

Question 7(a). Describe the following computer ports: (i) USB port; (ii) Ethernet port. [6 marks]

(i) USB port: A Universal Serial Bus port is used to connect external devices such as flash drives, keyboards, mice, printers, scanners and external hard drives to a computer. It can also be used for data transfer and charging some devices.

(ii) Ethernet port: An Ethernet port is a network port used to connect a computer or device to a wired local area network using an Ethernet cable. It is commonly used for internet and network communication.

Question 7(b)(i). What is cloud storage? [2 marks]

Cloud storage is a service that allows users to store data on remote servers accessed through the internet instead of storing the data only on a local computer or storage device.

Question 7(b)(ii). State two advantages and two disadvantages of using cloud storage for a school. [4 marks]

Advantages:

• Files can be accessed from different devices and locations through the internet.

• It supports backup and reduces the risk of losing files when a local computer fails.

Disadvantages:

• It requires internet access, so poor connectivity can prevent access to files.

• There may be privacy and security risks if accounts are not protected properly.

Question 7(b)(iii). Give two examples of cloud storage services. [2 marks]

• Google Drive

• Microsoft OneDrive

• Other examples include Dropbox, iCloud and Box.

END OF SOLVED PAPER